octavo. It is written from the point of view of the author's nationality, and naturally such new matter as it contains is chiefly in reference to the palæontology of the Austrian Empire.

E. R. L.

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## OUR BOOK SHELF.

*Text-book of Physiography.* By Edward Hull, M.A., LL.D., F.R.S. (London: Deacon and Co., 1888.)

FROM the Director of the Irish Geological Survey we should naturally expect a text-book of exceptional merit, but we must confess at the outset that he has disappointed us. In the first place, he does not seem to have a clear conception as to the scope of his subject. Physiography is essentially an introduction to the study of natural forces and their effects, and consequently not only comprises the various movements and physical features of the earth, but also includes a study of the various forms of energy and the properties of matter. Of the latter, Prof. Hull has written nothing. Again, it is difficult to see for what class of students the book has been written. It is evidently not for beginners, being avowedly addressed to those who have access to the Transactions of the learned Societies; and the treatment is far too superficial for advanced students.

The first part of the book is designated "Astronomical and Introductory," the earth being considered in relation to the other planets. The questions of latitude and longitude, and a chapter on the moon, fall under this head. This part of the subject is treated so briefly that very careful reading will be necessary on the part of those who are not previously acquainted with it.

Part II. deals with "Terrestrial Physics and Dynamics," and discusses the form and structure of the earth, volcanoes, and earthquakes. The theory of a viscous stratum beneath the earth's crust is put forward as confidently as if it were the law of superposition of strata, and all reference to the objections which have been urged against it is omitted. It would be hard to compress more debatable matter into a page than has been effected in the diagram which illustrates this theory (p. 55).

The physical features of the globe, such as surface forms, oceans, coral islands, tides, air currents, and the functions of rivers and glaciers, are treated in Part III. Terrestrial magnetism also falls under this head, and this is really an excellent outline of the subject, as far as results go; but practically nothing is said about the instruments which are employed. As a compromise between the views of Darwin and Murray regarding coral reefs, Prof. Hull suggests (p. 110) that "the volcanic islands and banks of organic materials are themselves planted on a floor formed by the surface of a continent, which once occupied the region of the Central and Western Pacific." We will leave the opposing parties to form their own opinions as to the value of this suggestion.

The geographical distribution of plants and animals forms the subject of Part IV., and here there is little to complain of.

The book is illustrated with thirteen coloured plates and maps, and eleven diagrams. Some of these, as, for example, the map showing the lines of equal magnetic variation and declination for the British Isles, are excellent. The whole book bears traces of having been written hastily, and we cannot but regret that the author of "The Coal-fields of Great Britain" should have added one more to the already too large number of text-books that seem to present physiography as a subject in which no originality is possible.

*The Clyde, from its Sources to the Sea.* By W. J. Millar, C.E. (London: Blackie and Sons, 1888.)

MR. MILLAR has succeeded in writing an interesting book about the Clyde, and about Glasgow in particular. The subject is worthy of the care devoted to it by the author, for what river or city in the United Kingdom has more varied industries to boast of, and where are the applications of science more numerous?

Probably no river owes its improvements more to the engineer than the Clyde. We are told how eminent engineers were called in, and surveys made, in order to deepen the river and make it more navigable; Smeaton and James Watt each had their turn, and afterwards many well-known men in their time reported on the same subject. The result is that the Clyde of to-day is able to float the largest ocean steamers in its harbour, a state of things of which the people of Glasgow are justly proud.

The growth of the steam-ship, of course, occupies much space, since it was on the Clyde the first successful attempts at steam navigation were made. These are duly described, and the boats illustrated. On recent Clyde-built ships our author has much to say, and, among other things, he gives an account of some experiments conducted by the late Mr. William Denny to investigate the relation existing between speed and resistance of ships. Messrs. Denny, at their ship-building yard at Dumbarton, have constructed an experimental tank with all the requisite machinery for the purpose, thus carrying on the investigations initiated by the late Dr. Froude.

This volume gives one a good insight into the varying industries carried on in Glasgow and its neighbourhood, and contains much general information about the district. The book is well written, nicely printed and illustrated, and should find a place in the libraries of the citizens of St. Mungo, and others interested in the progress of the district.

*A Playtime Naturalist.* By Dr. J. E. Taylor, F.L.S. (London: Chatto and Windus, 1889.)

DR. TAYLOR explains that he has a liking for intelligent English lads, "just as some people have for blue china and etchings"; and he "ventures to think the former are even more interesting objects." Accordingly he has written this little book for the instruction and entertainment of his "human hobbies." The work contains abundant evidence of the author's knowledge and enthusiasm, and any boy who may read it carefully is sure to find something to attract him in the chapters on birds, Lepidoptera, land shells, toads, frogs, newts, invisible life, microscopic plants, and other subjects. The style is clear and lively, and there are many good illustrations.

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## LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

### The Climate of Siberia in the Mammoth Age.

PROF. A. NEWTON, in his remarks on my letter, says that the similarity of the birds of Japan and of Europe has been long known. Of course it has. It is an elementary postulate in geographical zoology; but this is not the fact to which I called special attention, and from which I drew my inference. That fact is that, while the birds of Japan and England are in certain species undistinguishable, the corresponding birds of Siberia are sufficiently different to be classed as separate species. This could not be known, in the sense of being proved, until the avifauna of Siberia had been worked out from end to end, resulting in the formation of such a continuous series of skins as that in the possession of my friend Mr. Seebohm.

Prof. Newton goes on to argue that the remarkable fact here referred to is to be explained by the hypothesis that the birds of

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Japan and Europe live in insular climates, while those of Siberia occupy an area with a continental climate. I do not think many biologists can accept this explanation. England and Japan are 3700 miles apart. That a single bird whose normal type is found in Siberia should vary from that type in two areas thus remote from one another in precisely the same way is perhaps possible. That a whole string of birds (and I only mentioned a sample) should do the same is, it seems to me, when tested by the doctrine of chances and the infinite variability of bird structure and colour, an impossibility.

Apart from this *a priori* argument, we have the fact—which is, of course, known to Prof. Newton—that Blakiston's line separating Yesso and the southern island of Japan also separates two avifaunas, and that the species on each side of the narrow strait of Yesso are in many cases different, although they live in insular areas close to one another, and subject to virtually the same insular climate, while those of England and Japan, whose climate is not so like, are undistinguishable. I cannot, therefore, for a moment accept Prof. Newton's theory as in any way meeting the facts which are admirably met at every point by the theory which I have propounded, and which is not based on the variation of the birds alone, but upon a whole *catena* of converging evidence from many sides, the evidence of the birds being only a subsidiary support.

I am sorry that I had overlooked Prof. Newton's article in the "Encyclopædia," and am glad that my suggestion about the red grouse, which I can assure him was quite independently made, had already occurred to and been countenanced by so distinguished an ornithologist, against whom I hear continual complaints, which ought to be very flattering, that he writes too little.

Reverting to the main issue, it is a great pleasure to me to have Prof. James Geikie's permission to publish an extract from a letter which he has sent to me, in which he is completely at one with me in the conclusion that, when the mammoth lived, the climate of Siberia was temperate, and that it lived where its remains are found. This is particularly gratifying to me, not only because Prof. J. Geikie is the most learned and voluminous writer upon the so-called Pleistocene age, his stout volumes being marked as much by their extraordinary profusion of references and of facts as by their lucid arrangement, but because upon some of the main conclusions I have arrived at he takes a very different view. Prof. J. Geikie says:—

"I do not need to be converted to the view that Siberia formerly enjoyed a temperate climate. If you will consult the first edition of my 'Great Ice Age' (p. 494), you will see that my belief for the last fifteen years has been that the mammalian remains of North Siberia are the relics of a fauna that lived and died in those now dreary regions. Indeed, I had that notion when I first began to read what had been written upon the subject some five-and-twenty years ago! I was willing, however, to admit the possibility of some of the remains having been drifted north by rivers. But it has always seemed to me inconceivable that this drifting would account for the presence of such great ossiferous accumulations as travellers have described. I likewise long ago discarded the notion of seasonal migrations, such as Dawkins and others have maintained (see *Geol. Mag.*, 1872, p. 164; 1873, p. 49)."

I shall not labour the argument further, nor shall I enlarge upon what I deem to be an inevitable corollary from it—viz. that if the climate of Siberia was temperate when the mammoth lived, and if it lived where its remains occur, on the now bare and almost perpetually frozen *tundra*, it follows that its extinction there must have been followed by a most rapid, if not a sudden, change of climate. The existence of its *undecayed carcasses* in all parts of Siberia, from the Obi to the Indigirka, is consistent only with this conclusion. If the change of climate had been gradual, the flesh of the great beasts could not have been preserved intact, but would have putrefied and decayed. This was long ago seen and emphasized by Cuvier, and even Lyell was constrained to write:—"It is certain that, from the moment when the carcasses both of the rhinoceros and the elephant above described were buried in Siberia, in lat. 64° and 70° N., the soil has remained frozen, and the atmosphere as cold as at this day." Again, he says:—"One thing is clear, that the ice or congealed mud in which the bodies of such quadrupeds were enveloped has never once been melted since the day when they perished, so as to allow the percolation of water through the matrix, for, had this been the case, the soft parts of the animals could not have remained undecomposed." It was to avoid the necessarily awkward inference from this conclusion, for one who preached uniformity so continuously, that Lyell was forced to invoke his theory of river portage, which is no longer tenable, and, so far as I know, is no longer held by any serious student.

HENRY H. HOWORTH.

Bentcliffe, Eccles, February 3.

### *Peripatus* in Victoria.

It may interest some of the readers of your journal to know that last week, while collecting in a fern-tree gully at Warburton, on the Upper Yarra, Victoria, I had the good fortune to discover two specimens of *Peripatus*, belonging, as I think, to a new and certainly to a very beautiful species.

I hope to publish a full description, with figures, of the species as soon as possible, but I am now preparing for a visit to Tasmania, and some time must necessarily elapse before I can complete the work. I should therefore be greatly obliged if you could find space for this letter in NATURE.

In his "Monograph on the Species and Distribution of the Genus *Peripatus*," recently published in the *Quarterly Journal of Microscopical Science*, Prof. Sedgwick makes no mention of the occurrence of the genus in Victoria; though he describes in detail the Queensland and New Zealand species. In a note in the Proceedings of the Linnean Society of New South Wales (vol. ii. Part 1, 1887), however, Mr. Fletcher has recorded the discovery of the genus in Victoria. He says, "The specimen which I exhibit this evening was given to me a fortnight ago by my friend Mr. R. T. Baker, of Newington College, who had obtained it a few days previously either in or under a rotten log at Warragul, Gippsland, Victoria. It has fifteen pairs of claw-bearing appendages, and has nearly the same dimensions as are given in the abstract referred to; it is therefore in all probability an example of *P. leuckartii*, Sänger."

From Mr. Fletcher's account I am not able to say definitely whether the specimens obtained by me belong to the same species as the single specimen which he mentions; but after carefully studying Prof. Sedgwick's full description of *P. leuckartii*, I am fairly certain that they do not belong to that species, but to a new one which I for the present refrain from naming.

Both of my specimens were captured under fallen logs, where they were lying quite still. The first appeared to be dead soon after it was caught, and was therefore placed at once in alcohol. The second was found under a damp, rotten log, probably of *Eucalyptus*, in the same gully. It was taken home alive and put to crawl about on a newspaper, when it appeared very active. It elongated considerably when crawling, so that the legs came to be much further apart than when the animal was at rest, and when crawling it measured about 39 millimetres in length, excluding the antennæ. When irritated at the head end it ejected a surprisingly large quantity of an intensely sticky fluid, of a whitish colour, from the oral papillæ.

The species has, as in the two already described Australasian forms, fifteen pairs of claw-bearing legs, but it differs very strikingly indeed both from *P. leuckartii* and from *P. novæ-zealandiæ* in the colour and markings of the body. The general tint is brownish red, with only traces in one specimen of the bluish colour so characteristic of the two above-mentioned species. The markings on the body are singularly distinct and well defined, and identical in the two specimens. All down the dorsal surface there runs a median broad reddish-brown or chestnut-coloured band, divided into a series of diamond-shaped patches by regular lateral indentations, one diamond corresponding to each pair of legs. In the middle of this band there is a thin, median, whitish line. On either side the chestnut-coloured band is edged by a narrow black line, which follows the indentations of its margin, and outside this comes a broad band of darker brown, and then, at the edge of the dorsal surface, a narrow band of light brown. The ventral surface is light yellowish-brown, speckled with spots of very dark pigment, especially abundant at the base of each leg. In the mid-ventral line there is a row of white spots, one between the two legs of each pair except the first (?) and the last (where, of course, the genital opening is situated). The antennæ are light brown, closely ringed all the way up with very dark brown or black.

This species, though small, is to my mind even more beautiful than any of those figured by Prof. Sedgwick, and I think there can be little doubt as to its distinctness. The anatomical features I hope to describe at a later date, and perhaps they will throw further light upon its relations to previously described forms.

ARTHUR DENDY.

University of Melbourne, December 18, 1888.

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